Kentucky Lake Bass Assessment 2013

Kentucky Lake is a Tennessee Valley Authority (TVA) mainstem reservoir on the Tennessee River in western Kentucky and western Tennessee. Kentucky Lake was impounded by the completion of Kentucky Lake Dam at Tennessee River mile 22.4 in 1944 to form the 160,234-acre reservoir. Approximately 51,300 acres of Kentucky Lake lies in Kentucky. The Kentucky portion of Kentucky Lake is classified as a eutrophic lake.

Water levels at Kentucky Lake fluctuate annually approximately 5 feet between summer and winter pool levels. Winter pool level is 354 feet above sea level (fasl) and is obtained by the first of December. Water levels begin to rise on April 1 to reach summer pool level of 359 fasl by May 1. The water level is slowly drawn down from summer pool beginning July 5th to reach winter pool by December. Kentucky Lake has a mean retention time of 30.3 $\pm$ 1.2 days. Kentucky Lake will often thermally stratify during mid to late summer.

Fish habitat in the form of natural woody structure and aquatic vegetation are limited in Kentucky Lake. The woody structure in the lake consists of stumps left along creek channels prior to impoundment, trees that have fallen along the shoreline and buttonball bushes that grow in the shallow littoral zone. Over time some stumps have deteriorated or been removed. The fallen trees deteriorate within a few years or wash away. Buttonball bushes often die due to high water levels which inundate the bushes for longer than they can tolerate. This has caused the shoreline bushes to recede toward dryer land. Aquatic vegetation (Eurasian water milfoil, Naiad, Coontail, and Pondweed) increases dramatically when water clarity increases due to drought conditions. In the mid to late 1980's drought conditions lasted about three years. During this period approximately 7,112 acres of submersed aquatic vegetation was growing in the Kentucky portion of Kentucky Lake. Declines in the acreage of aquatic vegetation occurred during the 1990's with a return to normal rainfall patterns and decreased water clarity. In 2000, TVA estimated that aquatic vegetation covered about 400 acres. Another drought period occurred around 2008, and aquatic vegetation had increased to almost 5,000 acres. After this period, the acreage of aquatic vegetation declined, only to increase again in 2012 when drought conditions returned. During these periods of dense aquatic vegetation in the lake the black bass population has done well. The weed beds provide a nursery area for small fish, and a good feeding ground for larger bass. Redear sunfish and black crappie, two species that thrive better in clear water and around the aquatic vegetation, have also increased in numbers. The Fisheries Division of the Kentucky Department of Fish and Wildlife Resources and local anglers have added stake beds, brush piles, and planted cypress and willow tree saplings throughout the lake to replace lost habitat in the littoral zone.

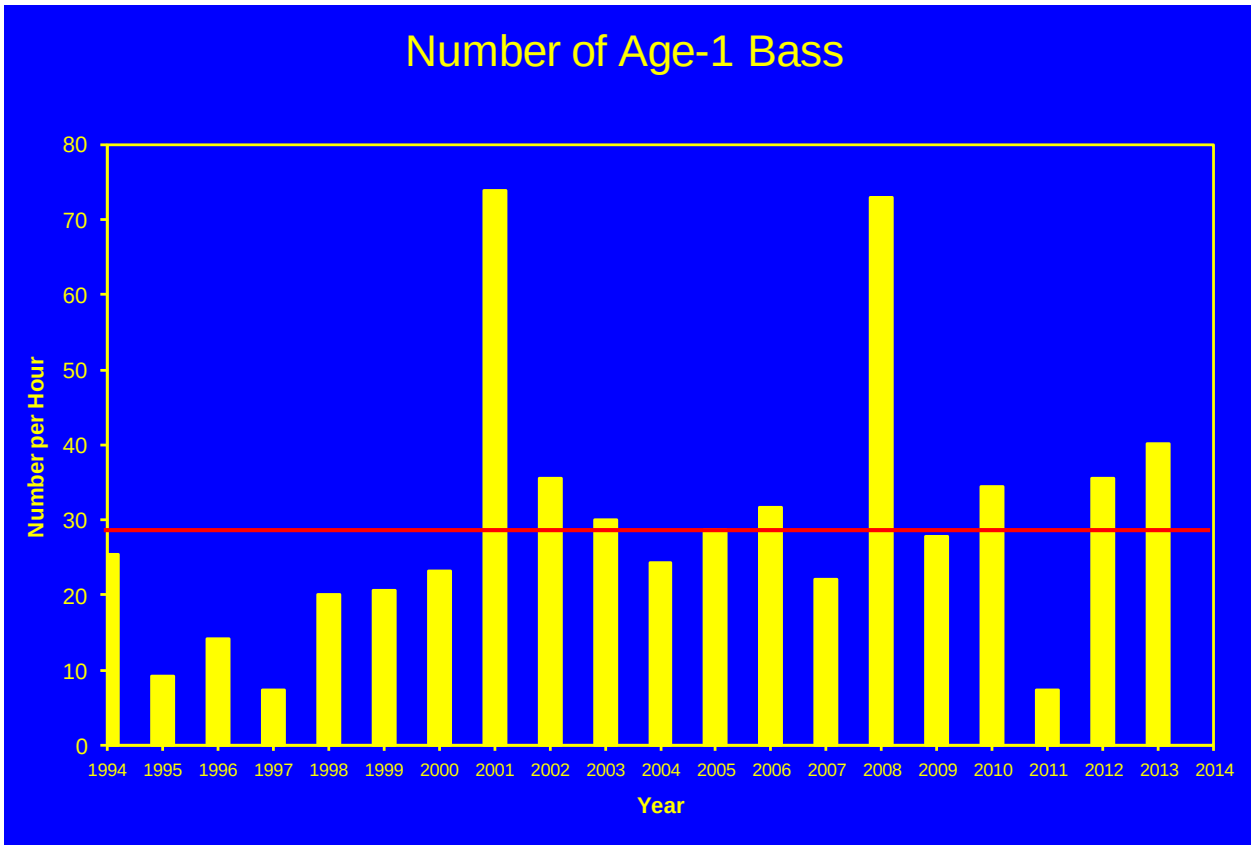
The following graphs show trends and rankings for each of the five population parameters used in the largemouth bass assessment. Please see "The Largemouth Bass Assessment" article for an explanation.

Parameter 1 – Length at age-3 (growth rate)

Largemouth bass at Kentucky Lake are aged about every 4 to 5 years. Age of bass is determined by counting rings on a small bone (otolith) which is removed from the fish. Counting rings on this bone is similar to rings of a tree. At Kentucky Lake, the length of an age-3 largemouth bass has averaged 12.6 inches at the lake since 1986 (represented by the red line). When compared to other lakes of this size, this is considered to be good growth for largemouth bass. Since 1996, at Kentucky Lake the growth rate of largemouth bass has been much better, with an average length by age 3 closer to 14.0 inches. The fast growth rate might be expected to decline slightly as strong year-classes reach age 3. Historical flooding hampered sampling in 2011, a year when age calculations were to be made, therefore resulting in a poor sample of bass. Aging was repeated in 2012. The aging completed in 2012 was similar to that prior to 2011. Therefore suggesting the decline in growth rate in 2011, indicated in the graph below, is most likely inaccurate.

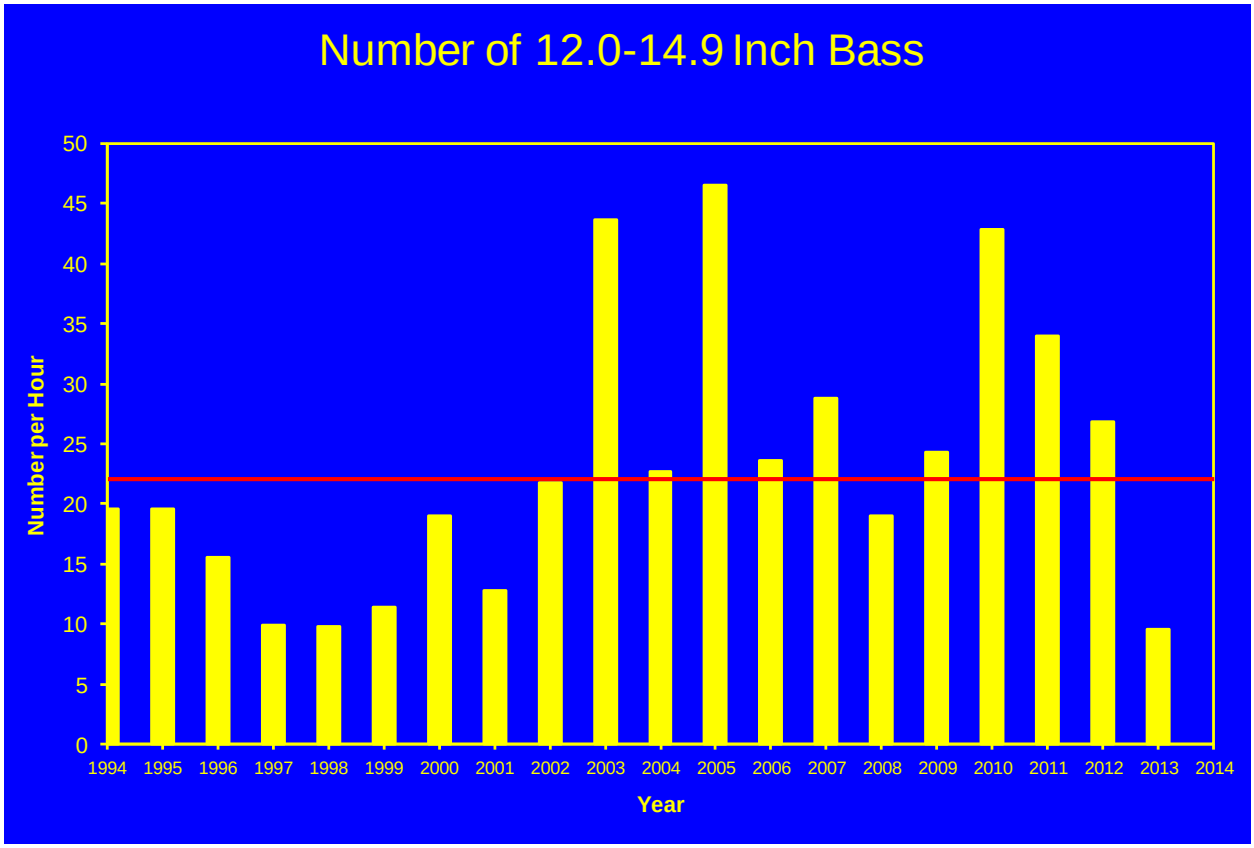
Parameter 2 – Numbers of age-1 bass (how good the spawn was)

KDFWR looks at the electrofishing catch rates of age-1 largemouth bass to assess the success of the spawn which occurred in the prior year. This is an important parameter because the number of age-1 bass produced represents how the population of harvestable size bass will be in a few years. At Kentucky Lake, age-1 largemouth bass catch rates have averaged 29.5 fish per hour of electrofishing. When compared to other lakes across the state, this is considered to be a good age-1 catch rate. Following drought periods in the Kentucky Lake drainage, which typically result in dense beds of aquatic vegetation, the number of small bass increased due to more successful spawns. Historical flooding hampered sampling in 2011, therefore resulting in a poor sample of bass.



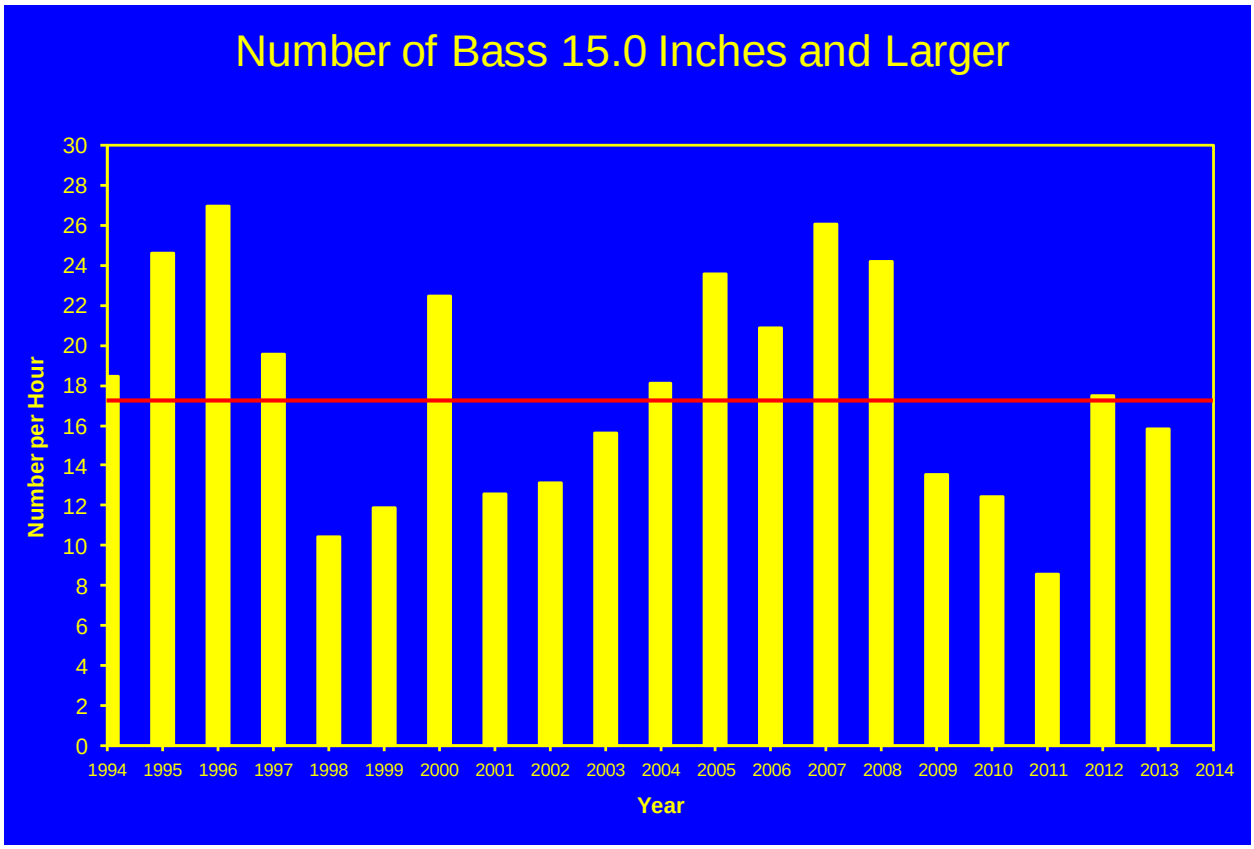
Parameter 3 – Numbers of 12.0-14.9 inch bass

The electrofishing catch of 12.0-14.9 inch largemouth bass has averaged 22.9 fish/hour over the years. This high catch rate of intermediate size bass gives Kentucky Lake a "good" rating when compared to other lakes of similar size across the state. The low catch rates recorded in the late 1990's are a response to the poor year classes produced from 1995 to 1997. The increases recorded in 2003 and 2005 are in response to the better year classes produced around 2001 to 2003. With the good spawn reported in 2007, this size group of bass increased in 2010. As the number of age-1 bass returned to more average numbers in 2008 and 2009, we anticipated the numbers of these intermediate size bass to also return to more normal levels. The much lower number reported in 2013 could likely be due to a poor sample caused by high water during the normal sampling period.



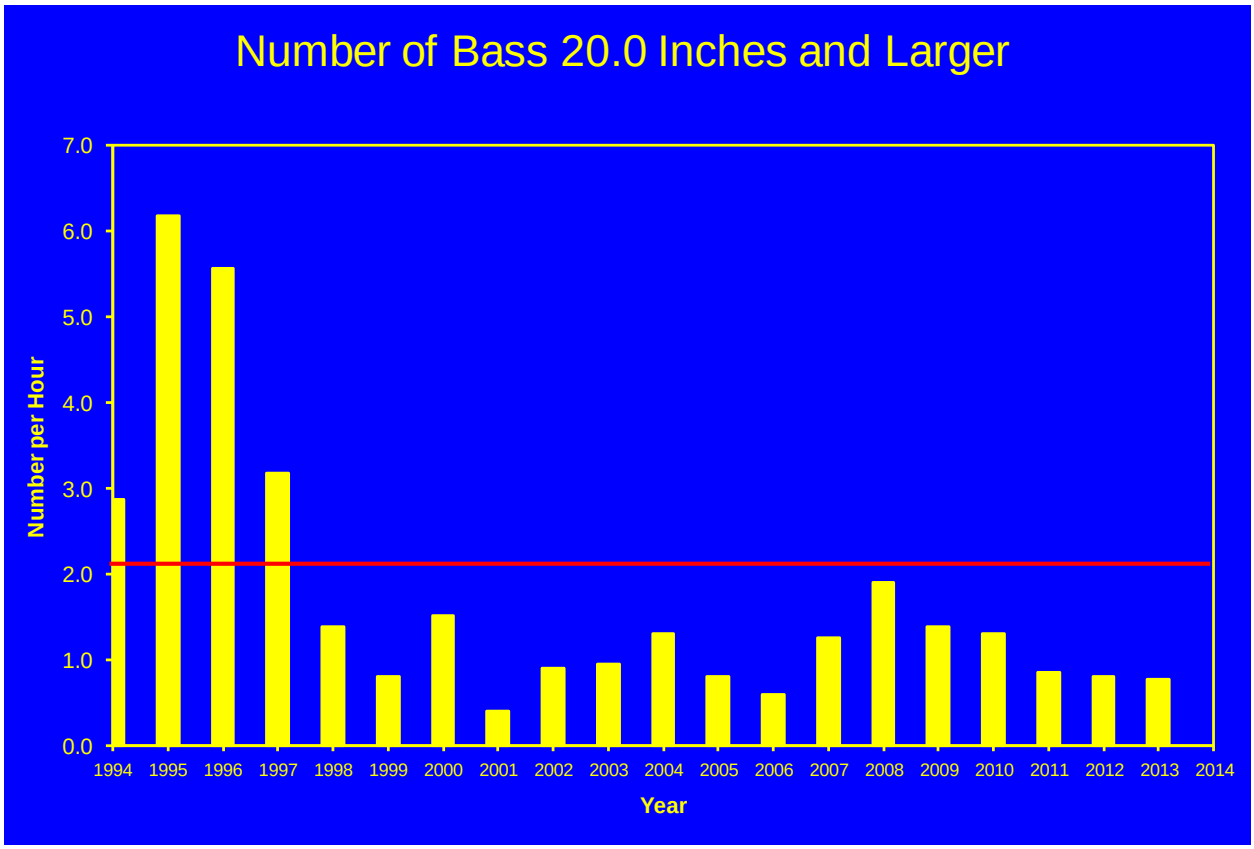
Parameter 4 – Numbers of 15.0 inch and larger bass

The catch rate of 15.0 inch and larger largemouth bass at Kentucky Lake has averaged 17.4 fish/hour of electrofishing. As compared to other lakes, this is a good catch rate for this size group. The numbers of 15.0 inch and larger bass at the lake increased in the mid 1990's due to good year classes produced during the drought period which was associated with more aquatic vegetation in the lake. The decline in numbers of harvestable size bass seen in the late 1990's and early 2000's was a result of poor year classes produced in prior years following the drought. The mid 2000's saw a return of above average catches of these keeper size bass due to good year classes produced in prior drought years. Numbers declined in the later part of 2000 due to some average to below average spawns in the mid 2000's. However, the decline in the catch rate may also be exaggerated due to poor sampling caused by flooding in 2010 and 2011 which altered the timing of sampling.



Parameter 5 – Numbers of 20.0 inch and larger bass

The electrofishing catch rate of 20.0 inch and larger largemouth bass has averaged about 2.0 fish/hour for Kentucky Lake since 1986. Based on this average value, this parameter of the fishery has rated “good”. The high catch rates recorded in the mid 1990’s were most likely associated with the prior drought and an increase in aquatic vegetation throughout the lake. The numbers of these larger fish declined in our samples in years following the drought. In other years when above average year classes were reported following drought periods, the number of trophy size fish increased slightly as the year classes aged. Why larger catches of these trophy fish weren’t observed could be related to sampling conditions, fish preference to be located near deep water, or the fish just are not there. It is suspected that the answer is one of the first two possibilities since tournament anglers continue to bring in record catches of these larger fish.



Overall – Total Assessment Score (All five parameters added together)

For the most part, the largemouth bass fishery for the past twenty years has rated "good". The exceptions are the 2008 rating of "excellent", and the 2011 rating of "fair". The "excellent" rating was achieved due to an above average spawn in 2007, yielding a record number of age 1 bass caught the following year. This "excellent" rating can also be attributed to the continued good growth rates and the high catch rate of bass larger than 15.0 inches. The rating of "fair" is likely due to poor sampling conditions.